

WHAT IS CLAIMED IS:

- 1 1. A method of bonding substrates, comprising:
2 depositing a layer of bonding substrate material onto a bonding surface
3 of a first substrate;
4 increasing a bonding site density of at least one of the layer of bonding
5 substrate material on said first substrate and a bonding surface of a second substrate;
6 and
7 bonding the bonding surface of the first substrate having the layer of
8 bonding substrate material to the bonding surface of the second substrate.
- 1 2. A method according to Claim 1, further comprising:
2 polishing the layer of bonding substrate material and the bonding
3 surface of the second substrate prior to the step of increasing the bonding site density.
- 1 3. A method according to Claim 2, wherein the step of polishing includes
2 using chemical-mechanical polishing.
- 1 4. The method according to Claim 2, wherein said step of polishing
2 includes polishing said layer and said second substrate to angstrom-level flatness.
- 1 5. A method according to Claim 1, wherein the step of bonding
2 comprises:
3 fusion bonding the first substrate and the second substrate at
4 substantially room temperature to form a package.
- 1 6. A method according to Claim 5, wherein the step of bonding further
2 comprises:
3 annealing the package for approximately two hours at approximately
4 200 °C.
- 1 7. The method according to Claim 1, wherein said step of depositing
2 includes depositing tetraethoxysilane, amorphous silicon, silicon nitride or glass frit.

1 8. The method according to Claim 7, wherein first substrate is formed of
2 glass.

1 9. The method according to Claim 8, wherein the second substrate is
2 formed of tetraethoxysilane.

1 10. A method according to Claim 1, wherein the step of increasing the
2 bonding site density comprises:
3 plasma treating at least one of the layer of bonding substrate material
4 and the bonding surface of the second substrate.

1 11. A method according to Claim 10, wherein the step of increasing the
2 bonding site density further comprises:
3 dipping the at least one of the layer of bonding substrate material and
4 the bonding surface of the second substrate in at least one of de-ionized water and
5 SC1 chemistry.

1 12. The method according to Claim 1, wherein the bonding substrate
2 material, the first substrate and the second substrate each have a substantially identical
3 refractive index.

1 13. A MEMS package, comprising:
2 a first substrate having a bonding surface;
3 a second substrate having a polished bonding surface facing the
4 bonding surface of the first substrate; and
5 a polished layer of bonding substrate material deposited onto the
6 bonding surface of the first substrate and fusion bonded to the polished bonding
7 surface of the second substrate.

1 14. A MEMS package according to claim 13, wherein the polished
2 bonding surface of the second substrate and the polished layer of bonding substrate
3 material have Angstrom-level flatness.

1 15. A MEMS package according to claim 13, wherein the first substrate,
2 the second substrate and the bonding substrate material each have a substantially
3 identical refractive index.

1 16. A MEMS package according to claim 13, wherein the first substrate,
2 the second substrate and the bonding substrate material form a hermetic seal around a
3 MEMS device.

1 17. A digital projector, comprising: /
2 a MEMS package, wherein the package comprises:
3 a first substrate having a bonding surface;
4 a second substrate having a polished bonding surface facing the
5 bonding surface of the first substrate; and
6 a polished layer of bonding substrate material deposited onto
7 the bonding surface of the first substrate and fusion bonded to the polished bonding
8 surface of the second substrate.

1 18. A digital projector according to claim 17, wherein the polished
2 bonding surface of the second substrate and the polished layer of bonding substrate
3 material have Angstrom-level flatness.

1 19. A digital projector according to claim 17, wherein the first substrate,
2 the second substrate and the bonding substrate material each have a substantially
3 identical refractive index.

1 20. A digital projector according to claim 17, wherein the first substrate,
2 the second substrate and the bonding substrate material form a hermetic seal around a
3 MEMS device.

1 21. A MEMS package, comprising: /
2 a first substrate having a bonding surface;
3 a second substrate having a polished bonding surface facing the
4 bonding surface of the first substrate; and

5 means for bonding deposited onto the bonding surface of the first
6 substrate and fusion bonded to the polished bonding surface of the second substrate.

1 22. A MEMS package formed by a method comprising the steps of: /
2 depositing a layer of bonding substrate material onto a bonding surface
3 of a first substrate;
4 increasing a bonding site density of at least one of either the layer of
5 bonding substrate material on said first substrate or a bonding surface of a second
6 substrate; and
7 bonding the bonding surface of the first substrate having the layer of
8 bonding substrate material to the bonding surface of the second substrate.